Proceeding to define the term "Inflation-Based Index"

Docket No. 2002-408-C

Direct Testimony

James E. Spearman, Ph.D.
Research Department

Public Service Commission of South Carolina

Q. Would you please state for the record your name, business address and position with the Public Service Commission of South Carolina?

A. My name is James E. Spearman. My business address is 101 Executive Center Drive, Columbia, SC. I am employed by the Public Service Commission of South Carolina as Research & Planning Administrator.

Q. Please summarize your educational background and professional experience.

A. I graduated from the Pennsylvania State University with a Bachelor of Science in Mineral Economics and from the Darden School of the University of Virginia with a Master of Business Administration. I received a Doctor of Philosophy in Resource Economics from West Virginia University with specialization areas in Regional Economics and Trade and Development.

My professional experience includes being a faculty member at the University of South Carolina-Lancaster and Erskine College where I taught a variety of economics and business courses. I also taught economics courses as an adjunct professor in the Graduate Business Program of Morehead State University. My experience also includes employment as an Economist at the Federal Highway Administration, as a consultant at Foster Associates, Inc., and as a Senior Economist at Ashland Inc. I joined the Research Department of the Public Service Commission in October of 1990.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to propose an inflation-based index by which rates for flat-rate local exchange residential service and single-line

business service provided by a local exchange carrier may be adjusted annually. Paragraph (B)(4) of Section 58-9-576 of the Code of Laws of South Carolina Annotated states, "For those companies to which item (3) applies, after the expiration of the period set forth above, the rates for flat-rate local exchange residential and single-line business service provided by a LEC may be adjusted on an annual basis pursuant to an inflation-based index."

Q. Do generally accepted inflation indices exist?

A. Yes. As a general rule, there are three indices that are used to measure inflation: the Consumer Price Index (CPI), the Producer Price Index (PPI), and the Gross Domestic Product price deflator (GDP-Deflator). The CPI is sometimes referred to as the retail price index or the cost-of-living index. The PPI is often referred to as the wholesale price index. Interest rates can also be used as a measure of inflation.

Q. Please provide some details describing the CPI and its usefulness as an inflation-based index for the purpose defined in the statute.

A. The CPI measures inflation as experienced by consumers in their daily living expenses. It measures the price increase for a basket of domestic and imported goods and services purchased for personal consumption by urban households. The CPI does not capture the changes in buying or consumption patterns that consumers make in response to relative price changes in goods and services, nor does it account for quality changes in goods and services. It is generally considered as an upper bound for inflation. Separate indices are reported for All Urban Consumers (CPI-U) and for Urban Wage Earners and

Clerical workers (CPI-W). The CPI-U is the most common and is the basis of my analysis.

Exhibit (JES-1) shows the CPI-U for All Items, South Urban All Items, All Items less Food and Energy, and Education and Communications for the years 1980-2002. Education and Communications is a new category created in 1993. I have included this category as it may be the most closely related to telecommunications. Also shown in Exhibit (JES-1) is the percent annual change in the CPI for each category. The percent change in the CPI is really more meaningful that the index itself.

Chart 1 plots the CPI for each category. The CPI for each category follows the same general trend. CPIs are highest for All Items less Food and Energy category and lowest for the South Urban All Items category. The CPIs for the All Items category lies between the others. CPIs for the Education and Communications category are not comparable to the others because of the different base year. However, when the other categories are converted to the same base as the Education and Communications category, the other categories follow the same trend as the Education and Communications category, but each of their CPIs are above those for the Education and Communications category.

Chart 2 plots the percent annual change in the CPIs for each category. The annual percent changes are quite volatile. CPIs for the All Items less Food and Energy category are the least volatile. For the period 1993-2002 where all categories can be compared, the Education and Communications

category has the most volatility. The annual percent changes in CPIs for the Education and Communications category range from about 1 percent to 4 percent while the percent changes for the other categories range from about 1 percent to 3 percent.

If the Commission determines that prices for flat-rate local residential service and single–line business service should reflect retail consumer prices, the CPI could be used as an inflation-based index. A broad index such as the All Items category will present the most competitively priced index because no single category can dominate the index. A more narrowly defined index such as the Education and Communications category may more closely reflect the price behavior of flat-rate local residential service and single-line business service. However, pricing in the more narrowly defined categories may be influenced by noncompetitive behavior and specific events. For a broad-based index I would recommend the CPI for the South Urban All Items category. I would recommend the CPI for the Education and Communications category for a more narrowly defined index.

Q. If the CPI were used as the inflation-based index, should a productivity or X- factor adjustment be included?

A. No. Consumer prices as measured by the CPI have already incorporated productivity impacts. Because of its broad coverage, we can assume that the CPI represents competitively determined prices. Competitive prices will reflect changes in productivity. For example, if wages rise by 5 percent and worker productivity rises by 5 percent, there would be no change

in the retail price. If worker productivity increases more than wage rates, the retail price would decline. If worker productivity increased less than the wage rate, retail prices would increase. Thus, ceteris paribus, competitive prices need no adjustment for productivity.

Another reason for not including a productivity adjustment is the lack of a good productivity measure. The CPI is a mixture of goods and services. What is the productivity for the service sector or for individual services? What is the productivity of the telecommunications industry?

Q. Please provide some details describing the PPI and its usefulness as an inflation-based index for the purpose defined in the statute.

A. The PPI measures changes in the selling prices received by domestic producers of goods and services. The target set of goods and services is the entire marketed output of U.S. producers. Imports are excluded. Although PPI coverage of service outputs is increasing, it is still very limited. Improved coverage of the service sector will be needed as the U.S. economy continues its shift toward more services and away from basic manufacturing. The PPI for the Finished Goods category is the most common of the producer price indices.

Exhibit (JES-2) shows the PPIs for the All Items category, Finished Goods category, Finished Goods less Food and Energy category, and Electronic and Other Electrical Equipment and Components category for the period 1980-1992. This exhibit also shows the percent annual change in the PPI for each category. PPIs increase each year for each category except Electronic and

Other Electrical Equipment and Supplies where the PPI increases each year until 1993 and then decreases each year.

Charts 2 and 3 plot the yearly indices and the percent annual change in the PPIs for each category, respectively. It is readily apparent from Chart 3 that the PPI for the Finished Goods less Food and Energy rises most rapidly during this period. The PPIs for the Finished Goods category and the All Items category follow each other fairly closely and do not increase as rapidly as the Finished Goods less Food and Energy category. The PPIs for the electronic and Other Electrical Equipment and Supplies category are generally much lower than the other categories and begin a declining trend in 1995.

Chart 3 plots the percent annual change in the PPI for each category. The percent annual changes in the PPIs are quite volatile. The least volatile of the categories is Electronic and Other Electrical Equipment and Supplies. In general the volatility of the PPI is greater than the volatility of the CPI. Thus, the changes in the PPI are not passed directly through to the CPI. Productivity changes in the producing sector may absorb some of the annual changes in the PPI, and retail market conditions may prevent price changes at the producer level from being passed on to the consumer level.

I would not recommend that a PPI be used as an inflation-based index for the purpose defined in the statute. The telecommunications industry has a large service component that is not captured by the PPI. Also, since the PPI is a measure of input prices, it does not reflect productivity impacts on the prices consumers pay for finished goods and services. A productivity

adjustment may be appropriate when using a PPI, but no good productivity measure exists.

Q. Please provide some details describing the GDP-Deflator and its usefulness as an inflation-based index for the purpose defined in the statute.

A. The GDP-Deflator combines the inflation experienced by governments (federal, state, and local), businesses, and consumers. It is perhaps the most inclusive of all price indices. A recent improvement to the GDP-Deflator has been the development of the chain-type price indices. The chain-type price index is an attempt to compensate for improvements in product quality and the changes in consumption patterns in response to relative price changes. I have used the chain-type price deflator in my analysis. However, the chain-type price deflator is virtually identical to the standard GDP-Deflator which is generally called the implicit price deflator.

Exhibit (JES-3) shows the chain-type GDP-Deflators for the period 1980-2002 for the Gross Domestic product category, Total Personal Consumption Expenditures category, Service Expenditures category, and the Telephone and Telegraph category. Percent annual changes in the GDP-Deflator are also shown in Exhibit (JES-3). The GDP-Deflators have shown continual increases over this period for the Gross Domestic Product category, Total Personal Consumption Expenditures category, and the Services Expenditures category. The GDP-Deflator has fallen each year since 1997 for the Telephone and Telegraph Expenditures category.

Chart 5 plots the GDP-Deflator for each category. The deflators for the Gross Domestic Product and Total Personal Consumption Expenditures are nearly identical over the entire period. The GDP-Deflator for the Services Expenditures is below all others until 1996 when it rises above all others. Each of these categories an increasing trend in the value of its GDP-Deflator. However, the GDP-Deflator for the Telephone and Telegraph category appears to have very little or no correlation with the other categories. The GDP-Deflator for the Telephone and Telegraph category rises rapidly from 1908 to 1986, remains fairly stable until 1997, and then declines.

Chart 6 plots the percent annual change in the GDP-Deflator for each category. With the exception of the Telephone and Telegraph category, the percent annual change in the GDP-Deflator for each category generally has not experienced the annual volatility of the PPIs. The percent annual change in the GDP-Deflator for the Telephone and Telegraph category exhibits substantial volatility. In general, the percent annual change in the GDP-Deflators tends to follow a similar trend as the percent annual change for the CPI categories.

If the Commission desires an inflation-based index that includes both a producer and a consumer component, the GDP-Deflator would be appropriate. I would recommend using the GDP-Deflator for Total Personal Consumption Expenditures. This category is broad enough to represent competitive prices and includes both goods and services. The Services Expenditures category could be used, but it does not include expenditures for

goods. The same criticism holds for the Telephone and Telegraph category which is a subset of the Services Expenditures category.

Q. If a GDP-Deflator were used as the inflation-based index, should a productivity or X- factor adjustment be included?

A. No. I would not include a productivity adjustment to a GDP-Deflator. A productivity adjustment would be inappropriate for the same reasons it is inappropriate for a CPI inflation-based index. The prices goods and services purchased by consumers already include the impacts of productivity. Also, I do not know how the productivity of the telecommunication industry is, can, or should be measured. Is it the productivity of the manufacturing of telecommunications equipment? Is it the productivity of the call centers in taking calls and resolving complaints? Is it the productivity of the sales force in signing up new customers or selling more functions and services to customer? How can these be integrated into a single measure of productivity?

Q. Should the volatility of the inflation-based index be of concern?

A. If the Commissioners are concerned about price stability, the volatility of the inflation-based index is a concern. Some of this concern can be alleviated by selecting a CPI or a GDP-Deflator as an index. Volatility can be reduced further by using some average index such as a five-year moving average. Exhibit (JES-4) shows the five-year moving average of the CPI for the South Urban All Items category and the Education and Communications category and of the GDP-Deflator for the Total Personal Consumption Expenditures category and the Services Expenditures category. The percent

annual change for the five-year moving average price indices is also shown in this exhibit.

Charts 7 and 8 plot the data shown in Exhibit (JES-4). The five-year moving average lessens the peaks and valleys in the annual price index series. Using a five-year moving average price index would result in smaller annual changes in the prices of flat-rate local residential service and single-line business service.

Q. Do you recommend a specific inflation-based index to comply with the statutory requirements?

A. My analysis indicated that either a CPI-based index or a GDP-Deflator-based index may be appropriate. If I had to select one specific index, I would choose the GDP-Deflator for Services Expenditures. This category included expenditures for telephone and telegraph and is broad enough to reflect competitive pricing. Also, the GDP-Deflator is a combination of producer (wholesale) prices and consumer (retail) prices. The GDP-Deflator also is attempting to incorporate changes in quality and changes in consumption patterns into its price index.

My second choice would be the CPI for Education and Communications. This category includes telecommunications and is broad enough to reflect competitive pricing. Quality changes and changes in consumption patterns are just beginning to be considered in the CPI.

If price stability is a major concern, I would recommend using a five-year moving average for the price index selected. A five-year period is long

enough to lessen the peaks and valleys that occur in the price index and short enough to capture changing trends.

Q. Does this conclude your testimony?

A. Yes.

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Exhibits and Charts

James E. Spearman, Ph.D.
Research Department

Public Service Commission of South Carolina

Exhibit (JES-1)

CONSUMER PRICE INDICES

	Consumer Price Index (1982-84=100)				Percent Annual Change in Consumer Price Index			
Year	All Items	South Urban All Items	All Items less Food and Energy	Education and Communications	All Items	South Urban All Items	All Items less Food and Energy	Education and Communications
1980	82.4	81.9	80.8					
1981	90.9	90.7	89.2		10.3	10.7	10.4	
1982	96.5	96.5	95.8		6.2	6.4	7.4	
1983	99.6	99.7	99.6		3.2	3.3	4.0	
1984	103.9	103.8	104.6		4.3	4.1	5.0	
1985	107.6	107.1	109.1		3.6	3.2	4.3	
1986	109.6	108.9	113.5		1.9	1.7	4.0	
1987	113.6	112.4	118.2		3.6	3.2	4.1	
1988	118.3	116.4	123.4		4.1	3.6	4.4	
1989	124.0	121.5	129.0		4.8	4.4	4.5	
1990	130.7	127.9	135.5		5.4	5.3	5.0	
1991	136.2	132.9	142.1		4.2	3.9	4.9	
1992	140.3	136.5	147.3		3.0	2.7	3.7	
1993	144.5	140.8	152.2	85.5	3.0	3.2	3.3	
1994	148.2	144.7	156.5	88.8	2.6	2.8	2.8	3.9
1995	152.4	149.0	161.2	92.2	2.8	3.0	3.0	3.8
1996	156.9	153.6	165.6	95.3	3.0	3.1	2.7	3.4
1997	160.5	156.9	169.5	98.4	2.3	2.1	2.4	3.3
1998	163.0	158.9	173.4	100.3	1.6	1.3	2.3	1.9
1999	166.6	162.0	177.0	101.2	2.2	2.0	2.1	0.9
2000	172.2	167.2	181.3	102.5	3.4	3.2	2.4	1.3
2001	177.1	171.1	186.1	105.2	2.8	2.3	2.6	2.6
2002	179.9	173.3	190.5	107.9	1.6	1.3	2.4	2.6

Note: For Education and Communication the CPI is based on December 1997 (Dec. 1998=100)

Source: U.S. Department of Labor, Bureau of Labor Statistics

PRODUCER PRICE INDICES

	Producer Price Index (1982=100)				Percent Annual Change in Producer Price Index			
Year	All Commodities	Finished Goods	Finished Goods less Food and Energy	Electronic and Other Electrical Equipment and Components	All Commodities	Finished Goods	Finished Goods less Food and Energy	Electronic and Other Electrical Equipment and Components
1980	89.9	88.0	87.1					
1981	98.0	96.1	94.6		9.0	9.2	8.6	
1982	100.0	100.0	100.0		2.0	4.1	5.7	
1983	101.3	101.6	103.0		1.3	1.6	3.0	
1984	103.7	103.7	105.5		2.4	2.1	2.4	
1985	103.2	104.7	108.1		-0.5	1.0	2.5	
1986	100.2	103.2	110.6	102.1	-2.9	-1.4	2.3	
1987	102.8	105.4	113.3	103.3	2.6	2.1	2.4	1.2
1988	106.9	108.0	117.0	104.6	4.0	2.5	3.3	1.3
1989	112.2	113.6	122.1	107.1	5.0	5.2	4.4	2.4
1990	116.3	119.2	126.6	108.9	3.7	4.9	3.7	1.7
1991	116.5	121.7	131.1	110.1	0.2	2.1	3.6	1.1
1992	117.2	123.2	134.2	110.8	0.6	1.2	2.4	0.6
1993	118.9	124.7	135.8	112.0	1.5	1.2	1.2	1.1
1994	120.4	125.5	137.1	112.7	1.3	0.6	1.0	0.6
1995	124.7	127.9	140.0	113.3	3.6	1.9	2.1	0.5
1996	127.7	131.3	142.0	113.2	2.4	2.7	1.4	-0.1
1997	127.6	131.8	142.4	111.6	-0.1	0.4	0.3	-1.4
1998	124.4	130.7	143.7	110.4	-2.5	-0.8	0.9	-1.1
1999	125.5	138.0	146.1	109.5	0.9	1.8	1.7	-0.8
2000	132.7	138.0	148.0	108.3	5.7	3.8	1.3	-1.1
2001	134.2	140.7	150.0	107.0	1.1	2.0	1.4	-1.2
2002	131.1	138.9	150.2	105.7	-2.3	-1.3	0.1	-1.2

Note: The PPI for Electronic and Other Electrical Equipment has a base of December 1984=100.

Source: U.S. Department of Labor, Bureau of Labor Statistics.

Exhibit (JES-3)

CHAIN-TYPE PRICE DEFLATORS FOR GROSS DOMESTIC PRODUCT

	Chain-Type Price Deflator				Percent Annual Change			
Year	Gross Domestic Product	Total Personal Consumption Expenditures	Service Expenditures	Telephone and Telegraph Expenditures	Gross Domestic Product	Total Personal Consumption Expenditures	Service Expenditures	Telephone and Telegraph Expenditures
1980	57.05	55.21	45.88	68.95				
1981	62.37	60.08	50.58	75.63	9.33	8.82	10.24	9.69
1982	66.25	63.48	54.81	83.42	6.22	5.66	8.36	10.30
1983	68.87	66.19	58.33	88.49	3.95	4.27	6.42	6.08
1984	71.44	68.63	61.35	95.04	3.73	3.69	5.18	7.40
1985	73.69	70.99	64.36	97.68	3.15	3.44	4.91	2.78
1986	75.32	72.72	67.31	100.71	2.21	2.44	4.58	3.10
1987	77.58	75.49	70.20	98.28	3.00	3.81	4.29	-2.41
1988	80.22	78.44	73.61	97.11	3.40	3.91	4.86	-1.19
1989	83.27	81.86	77.12	97.00	3.80	4.36	4.77	-0.11
1990	86.53	85.63	80.95	96.68	3.91	4.61	4.97	-0.33
1991	89.66	88.91	84.82	97.42	3.62	3.83	4.78	0.77
1992	91.85	91.62	88.50	97.51	2.44	3.05	4.34	0.09
1993	94.05	93.81	91.57	97.99	2.40	2.39	3.47	0.49
1994	96.01	95.70	94.16	100.11	2.08	2.01	2.83	2.16
1995	98.10	97.90	97.25	99.69	2.18	2.30	3.28	-0.42
1996	100.00	100.00	100.00	100.00	1.94	2.15	2.83	0.31
1997	101.95	101.94	103.12	100.22	1.95	1.94	3.12	0.22
1998	103.20	103.03	105.53	98.83	1.23	1.07	2.34	-1.39
1999	104.69	104.73	107.81	96.24	1.44	1.65	2.16	-2.62
2000	106.89	107.39	110.85	92.59	2.10	2.54	2.82	-3.79
2001	109.42	109.56	114.32	90.28	2.37	2.02	3.13	-2.49
2002	110.66	111.06	117.44		1.13	1.37	2.73	

Source: U.S. Department of Commerce, Bureau of Economic Analysis

FIVE-YEAR MOVING AVERAGE

	Consumer Price Index		Chain-Type GDP Deflator		Percent Annual Change			
					CPI		Chain-Type GDP Deflator	
Year	South Urban All Items	Education and Communications	Total Personal Consumption Expenditures	Service Expenditures	South Urban All Items	Education and Communications	Total Personal Consumption Expenditures	Service Expenditures
1980	67.1		46.73	38.80				
1981	74.0		50.73	42.34	10.3		8.56	9.12
1982	81.3		54.88	46.20	9.9		8.18	9.13
1983	88.2		58.96	50.21	8.5		7.44	8.67
1984	96.6		62.72	54.19	9.5		6.38	7.94
1985	101.1		65.87	57.89	4.7		5.03	6.82
1986	104.7		68.40	61.23	3.6		3.84	5.78
1987	108.1		70.80	64.31	3.2		3.51	5.03
1988	111.7		73.25	67.37	3.4		3.46	4.75
1989	115.7		75.90	70.52	3.6		3.61	4.68
1990	120.0		78.83	73.84	3.7		3.86	4.71
1991	124.6		82.07	77.34	3.8		4.11	4.74
1992	129.3		85.29	81.00	3.8		3.93	4.73
1993	134.1		88.37	84.59	3.6		3.60	4.43
1994	138.6		91.13	88.00	3.4		3.13	4.03
1995	142.9		93.59	91.26	3.1		2.69	3.70
1996	146.9		95.81	94.30	2.8		2.37	3.33
1997	150.7	92.0	97.87	97.22	2.5		2.15	3.10
1998	154.2	95.0	99.71	100.01	2.3	3.2	1.88	2.87
1999	157.9	97.5	101.52	102.74	2.4	2.6	1.81	2.73
2000	161.6	99.5	103.42	105.46	2.3	2.1	1.87	2.65
2001	164.9	101.5	105.33	108.33	2.0	2.0	1.85	2.72
2002	166.5	103.4	107.15	111.19	1.0	1.9	1.73	2.64

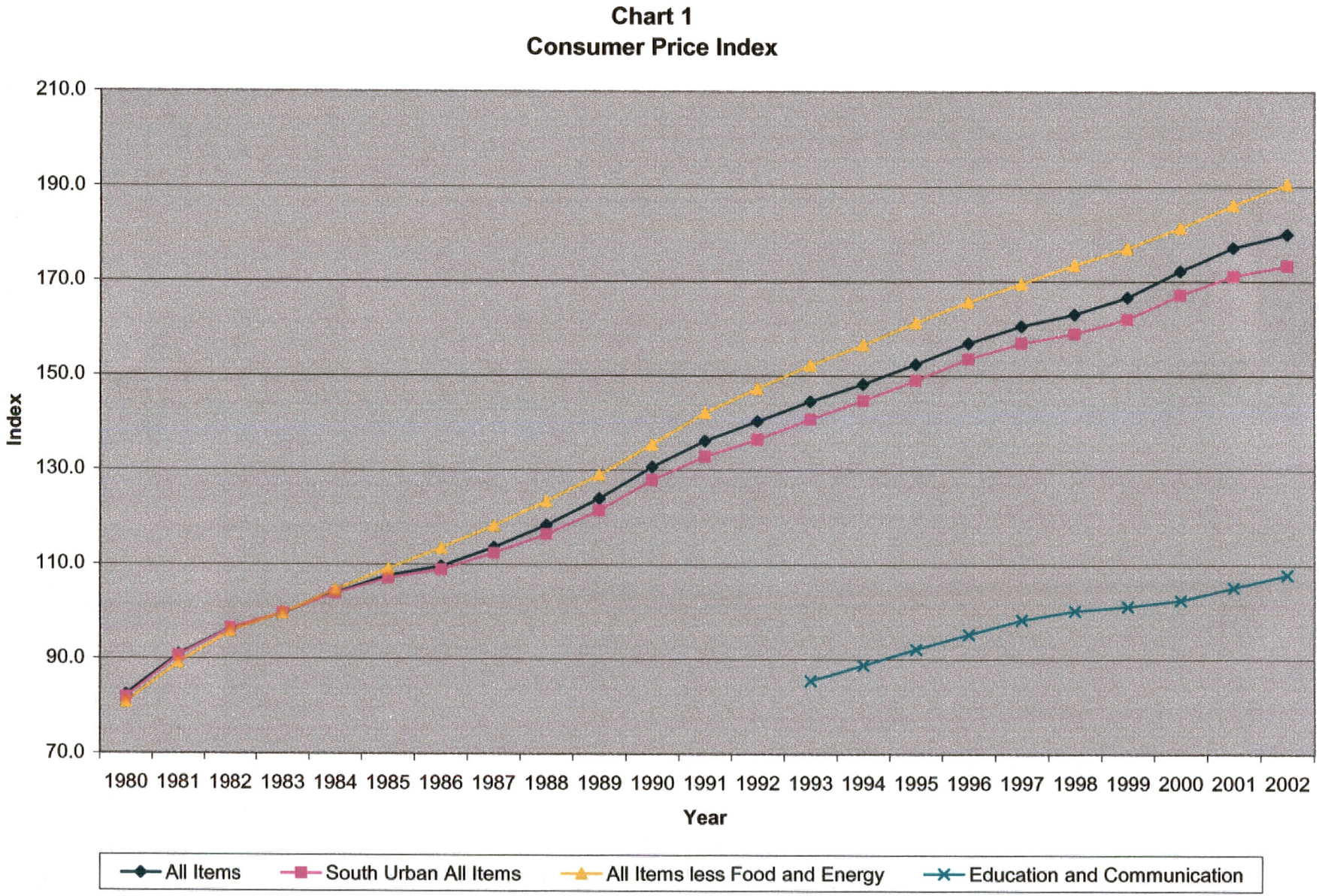

Chart 2
Percent Annual Change in Consumer Price Index

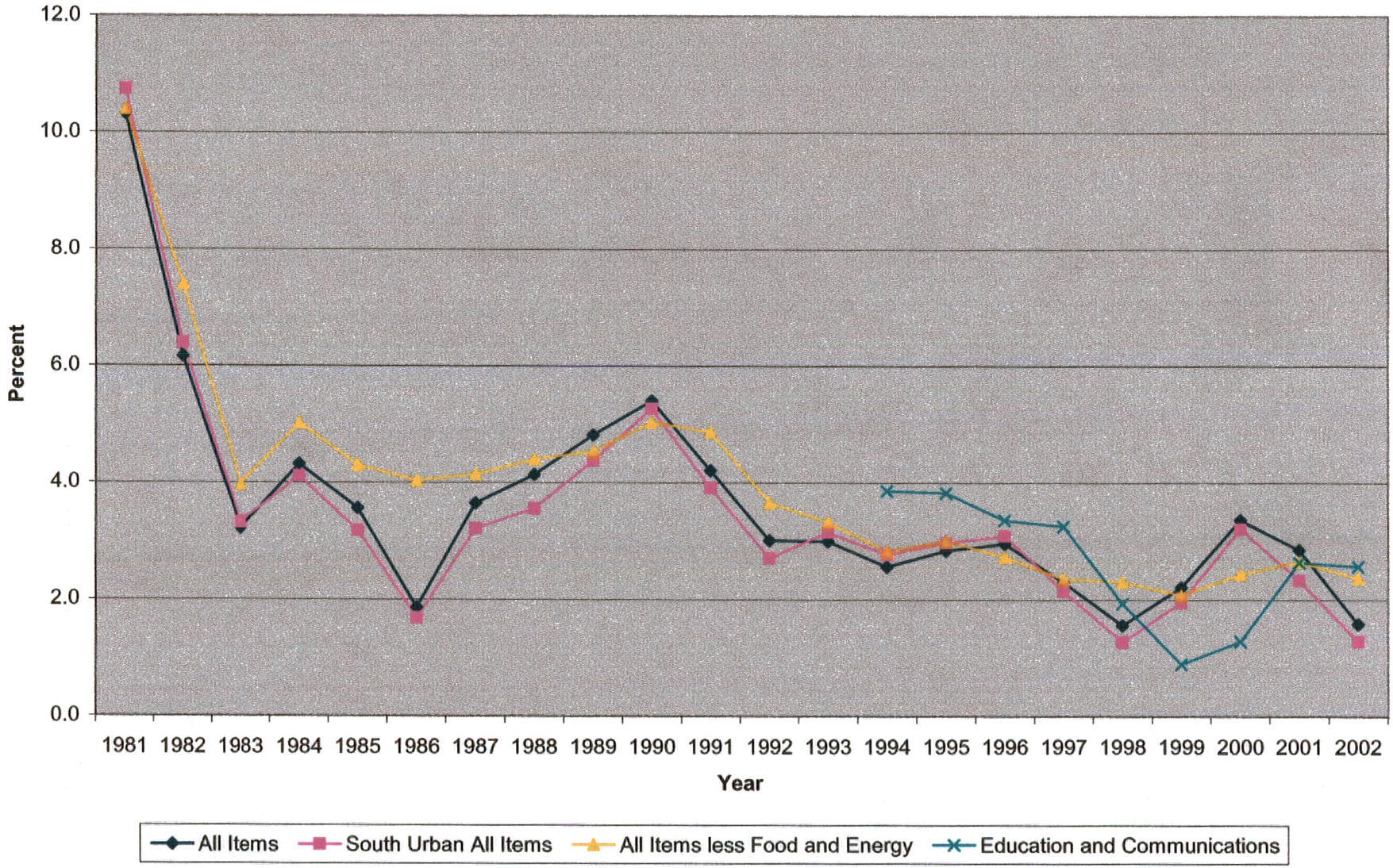

Chart 3
Producer Price Index

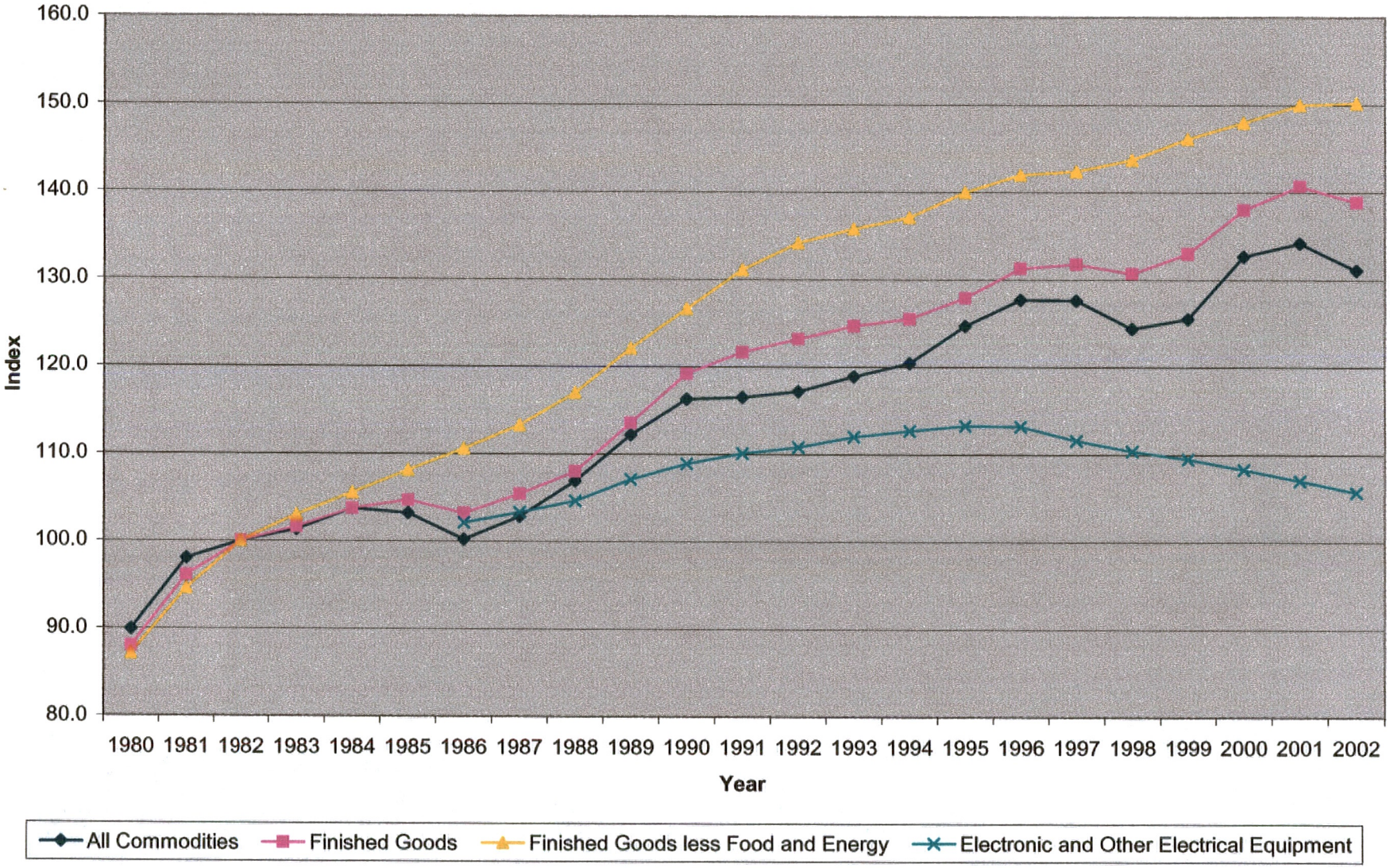

Chart 4
Percent Annual Change in Producer Price Index

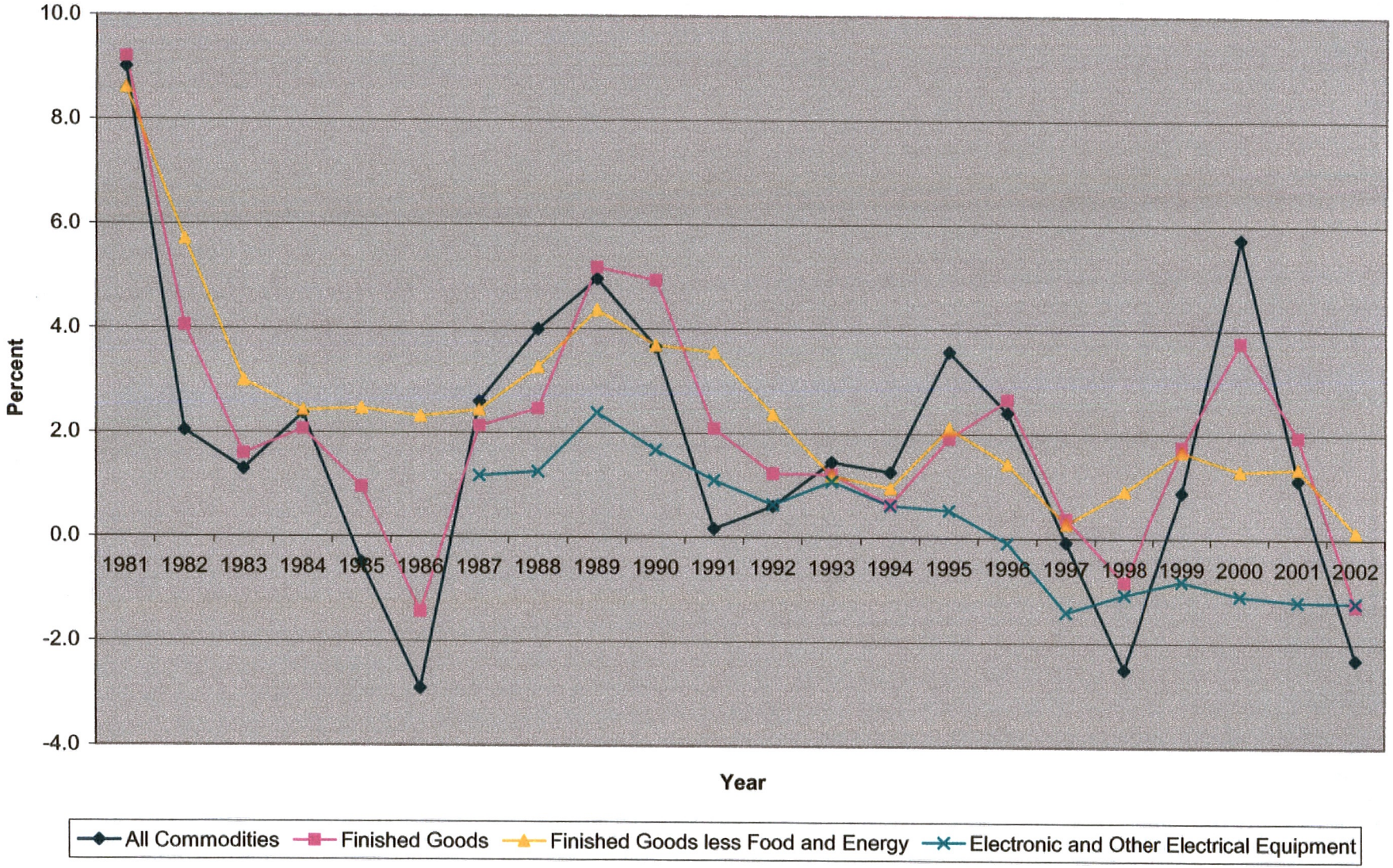

Chart 5
Chain-Type Price Deflator
1996 = 100

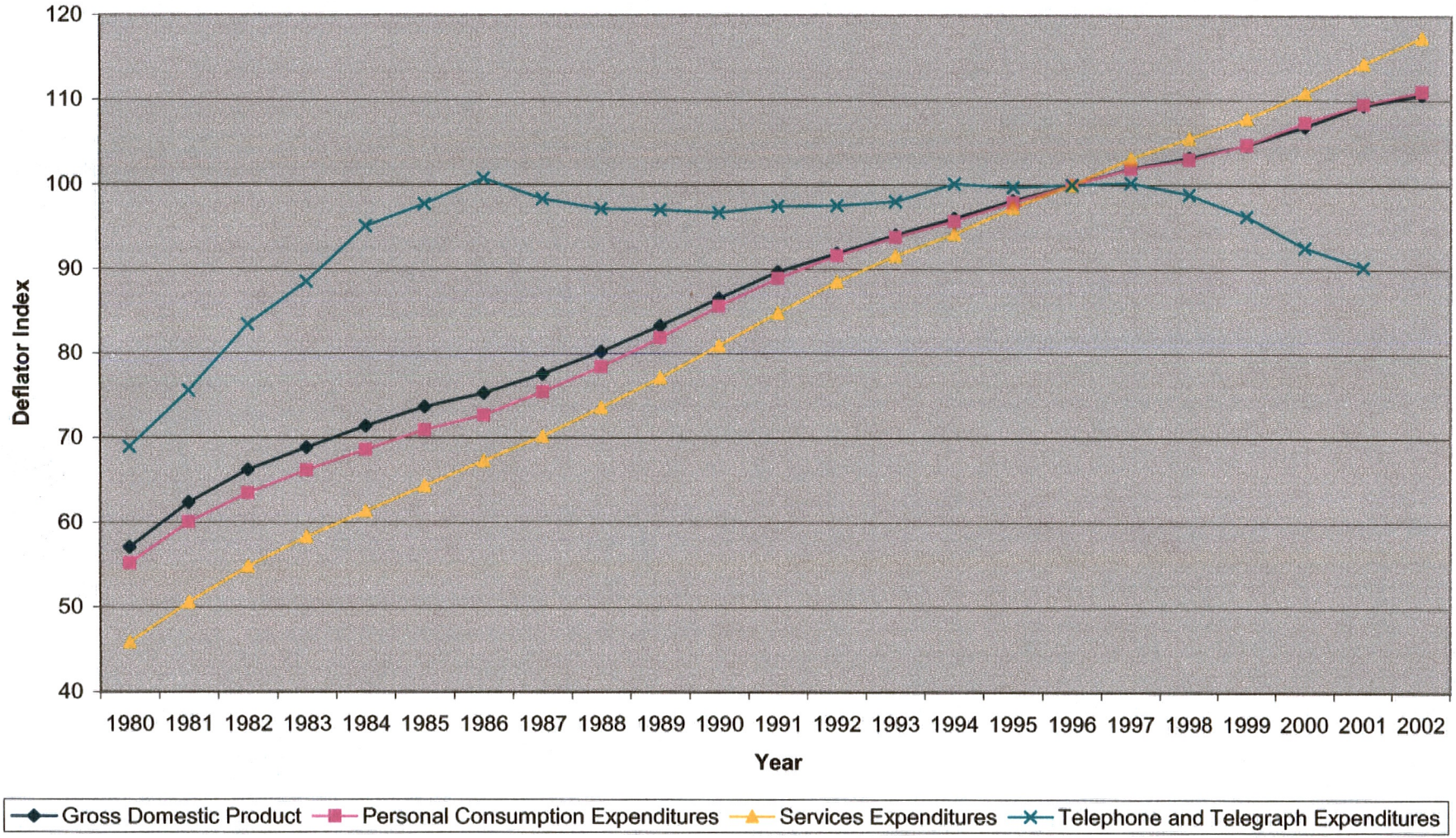

Chart 6
Chain-Type Price Deflator
Percent Annual Change

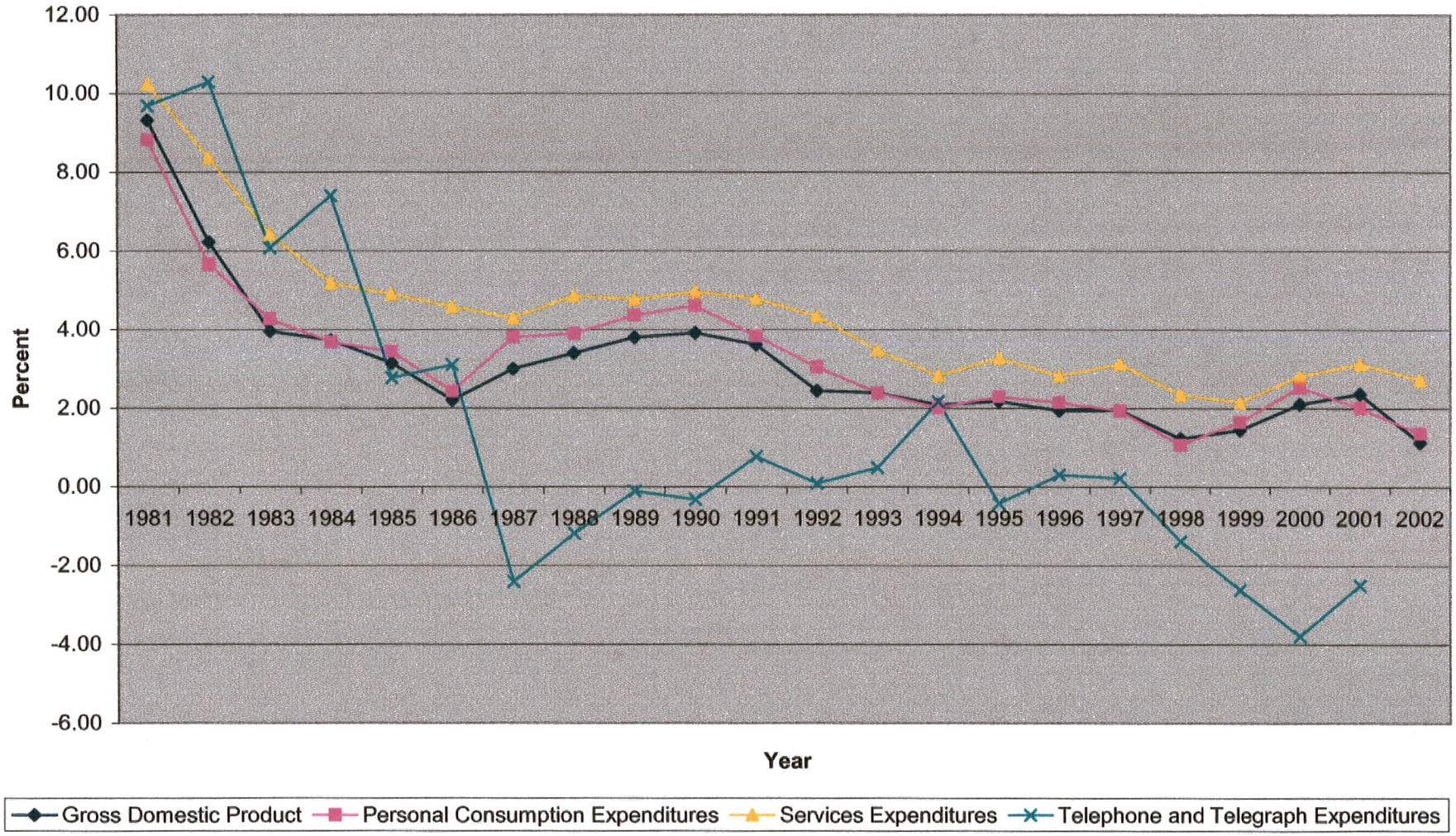

Chart 7
Five-Year Moving Average Price Index

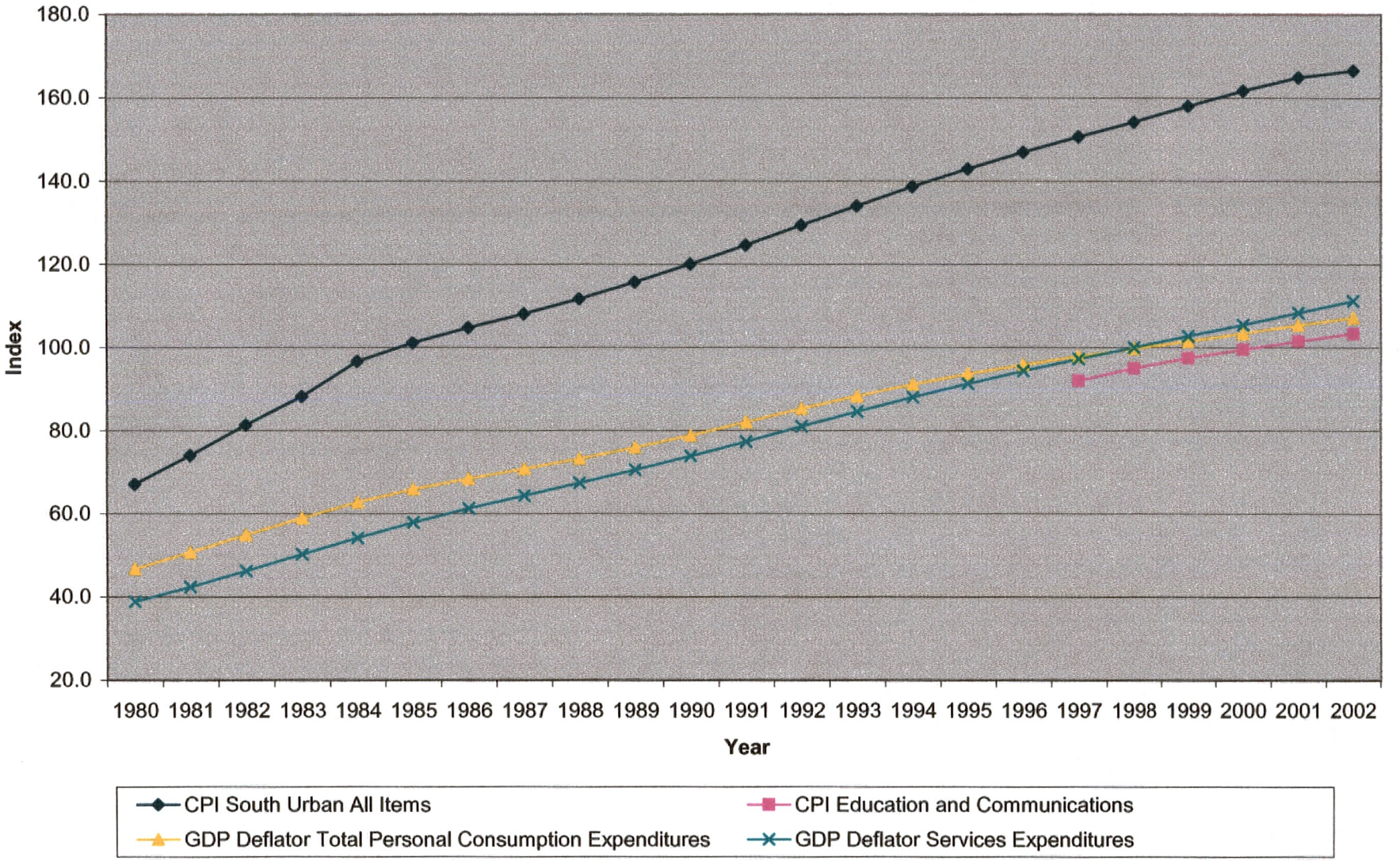

Chart 8
Percent Annual Change in Five-Year Moving Average Price Index